Iowa Farm Science

Volume 22 | Number 1 Article 4

7-1967

Swine in Confinement - The Growing - Finishing Unit

John Wallize
Iowa State University

Thamon E. Hazen
Iowa State University

Vaughn C. Speer
Iowa State University

William P. Switzer
Iowa State University

nary conditions around him.

A few days before farrowing, the sow is moved from the breeding pens to the farrowing house.

When pregnant sows are brought in for farrowing, they are cleaned to remove dirt and sprayed for lice and mange control. Then they are moved to the farrowing crates and left there until their pigs are weaned at about 2 or 3 weeks of age.

The farrowing house has dual temperature control, explains Dr. Thamon Hazen, ISU agricultural engineer who directs the facilities and environmental research at the experimental farm.

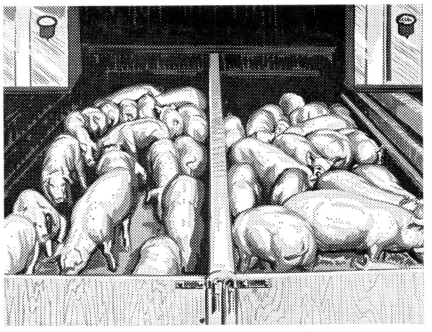
Heating coils are buried under the floor to keep the piglets warm. The building is also heated, and a flow of cool air from an air conditioning unit is piped to the sow in the summertime.

Originally, they tried air conditioning the entire house, but because of the odor and gas build-up in the house, a one-ton air conditioning unit was required for each sow. With today's low-margin, mass production of pork, the air conditioning investment on this basis was impractical, Dr. Hazen explains.

But with the dual zone system, where cool air is circulated just over the sow, an equivalent of one-tenth of a ton per sow is adequate. Thus, a 2-ton home air conditioning unit can handle a 20-sow farrowing house. This ISU finding helped many southern pork producers, who were about to abandon multiple farrowing and go back to seasonal farrowing—or more likely, go out of the hog business.

"However, this may not be the final answer," says Hazen. "As we said, the big problem in air conditioning is the odor and gases in the house. If this problem can be solved, we may bring back space air conditioning."

It is also in the farrowing house where much of the nutrition and management research is being conducted. The first few days of a baby pig's life are the most critical.



SWINE IN CONFINEMENT

The Growing - Finishing Unit

LIKE MOST of the units in the Iowa State University Swine Nutrition Research Center, the growing-finishing building can be described only as it is today. It isn't the same as it was yesterday—and it's likely to be a little different tomorrow.

The growing-finishing building is constantly being changed to find new answers to that distant goal—the ideal swine production system. And like other units on the research farm, this building serves as one example of what can be done—and maybe what should be avoided!

For instance, overheating floors should be avoided. Designed to keep pigs warm and comfortable, heated floors baked manure, instead. Now conventional air heating is available, but has not been needed the past two years. If the air is warm, the floors are warm also because of the insulated foundations, says Dr. Thamon Hazen, agricultural engineer in charge of environment and facilities research.

The ISU scientists also found smaller pens to be preferable. Originally, pens in the building were large enough for 65 animals. Today, they hold about 25 young pigs or 14 heavier ones.

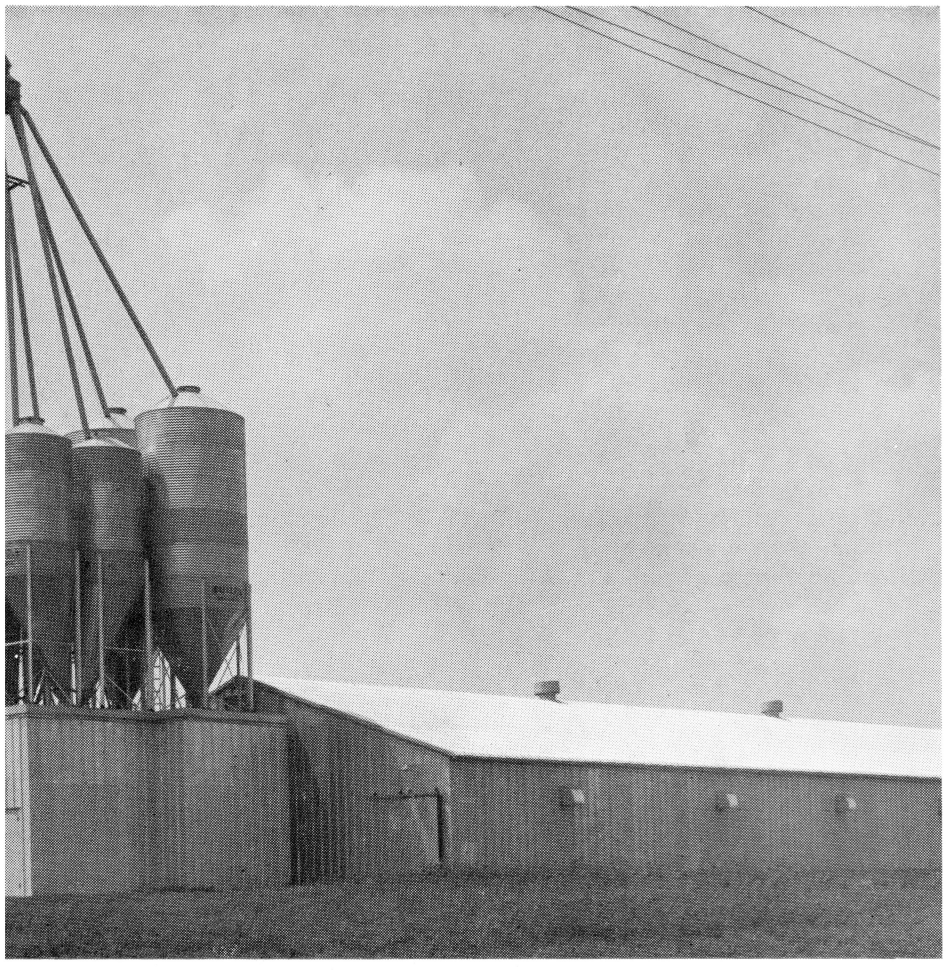
Holds 700 Pigs

The 50 by 120-foot clear span steel frame building contains 6,000 square feet—5,000 of which are devoted to space for 700 growing pigs. About 4 square feet are allotted for 30 to 110-pound animals and 10 square feet for 110 to 200-pound pigs. The floor and pigs are amazingly clean for such a concentration of animals.

Since the size of the pens and the number of pigs per pen have been reduced, there's been a marked reduction in tail biting or cannibalism. To further reduce the problem, tails are being docked at birth as part of the regular management program.

A constant trickle of water at one end of the pens apparently has some relationship to housekeeping habits of the animals. The trickle of water keeps the manure liquid, which helps in the disposal. But more important, the trickle of water seems to keep the pigs happy. And almost all body elimination takes place in the watered area, where it can be flushed away twice a day.

The other end of the pen remains so clean you could almost eat off the floor—in fact, the pigs do. A floor feeding system is used, where feed is dumped onto the concrete floor, rather than using feeders.



THE GROWING-FINISHING building at the ISU Swine Nutrition Research Farm is 50 by 120 feet and contains around 700 pigs. The ISU system is not held as a "model" system—but as an example of some of the things that can be done under confinement.

GROWING-FINISHING pigs are destructive, so pen dividers in the growing-finishing building are of pre-cast, reinforced concrete.

As mentioned earlier, involved in the ISU research program on swine confinement are animal nutritionists, agricultural engineers, and veterinarians. Probably what is needed now is a psychologist.

"We've learned a lot about pig behavior," explains Dr. Hazen. "We don't know why, but the trickle of water influences the behavior of pigs. Also, so does the smaller size pen. Just why these things work, we don't know. We just know they do."

Death losses were higher with the larger pens. Also, the smaller pens made daily inspection of individual pigs much easier.

The building originally contained 12 pens about 25 by 20 feet, each for 65 pigs. Partitions were used to separate the pen area from the dunging alley. These partitions have been removed, and the pen width was reduced from 20 feet to about 5 feet.

Center Alley Helps

Self-feeders were removed and replaced by a center alley 3 feet wide through the full length of the building. The alley facilitates moving and handling and inspection of animals.

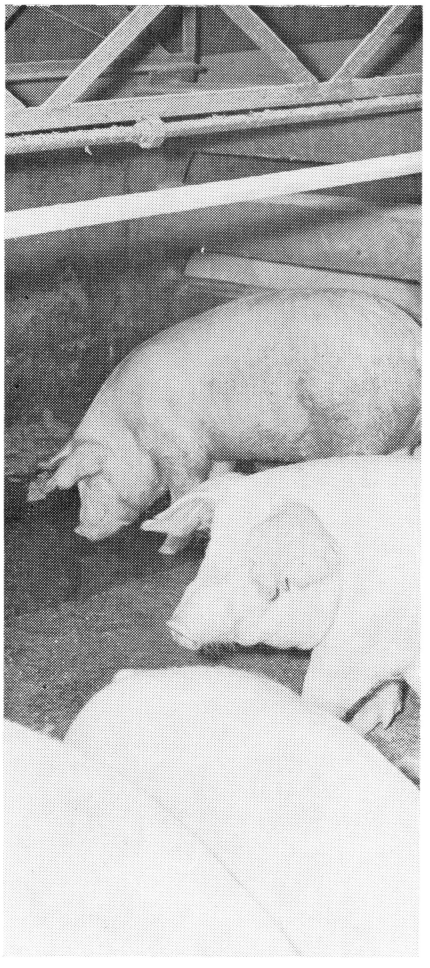
Pens are now about 23 feet long and slope one-half inch per foot to the dunging alley which runs along the outside walls. Twenty-five pigs are kept in the pen until they weigh about 110 pounds, and then the number is reduced to 14.

Both narrower pens and floor feeding seem to encourage the pigs to use the dunging alley. The influence of pen width isn't clearly understood, but floor feeding at the upper end of the long, narrow pens seems to train the pigs to keep the eating area free from waste materials. ISU studies have shown the pens are clean when pigs are floor fed, but when self fed, manure is deposited along partitions, and the floor area is generally dirtier and requires more frequent cleaning.

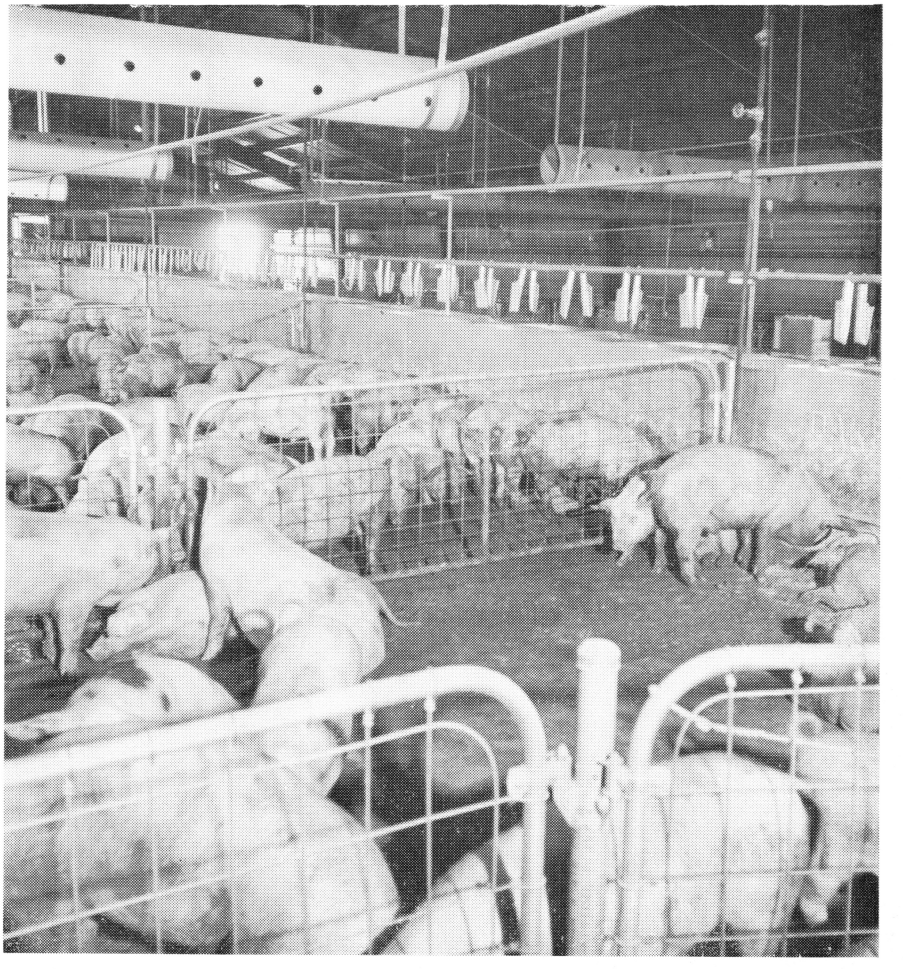
Animal habits also influence the type of materials used in the growing and finishing units. Pigs at this stage are very destructive and will eat on pen partitions, feeders, gates, etc. Pen dividers in the ISU unit are now made of precast reinforced concrete beams. These withstand the abuse well.

Before the growing-finishing building was remodeled, pens were scraped daily, and floors were hosed down with water from high pressure lines. This practice kept pens and animals reasonably clean and reduced odor, but required more than 5 hours a day of labor.

After pens were scraped and hosed, a shuttle-stroke cleaner moved the liquid manure from the



A TRICKLE of water in one end of the pen greatly improves the "housekeeping" habits of swine in confinement. Just why, ISU scientists aren't sure.



BEFORE REMODELING the growing-finishing building at ISU looked like this. Compare the dirty appearance of these pigs with those in other photographs after remodeling.

dunging alley into underground storage tanks. The shuttle-stroke cleaner did an excellent job of cleaning, but you had to be certain that pigs did not get back into the dunging alley during cleaning. Pigs are naturally curious, and operation of the cleaner resulted in injury to pigs attracted to it.

Lagoon Permits Changes

Construction of an experimental lagoon to handle wastes allowed major changes in manure handling procedures inside the building. The automatic cleaner is no longer used, but rather about 3 to 4 gallons of water per minute are sprayed into the upper ends of the gutters.

Once a day, manure which accumulates in the dunging alley along the wall is removed by increasing the rate of water flow for 1 hour to 10 gallons per minute. This system has increased cleanliness in the pen floors greatly and also resulted in improvement of the atmosphere in the building. The water appears to control odors by carrying out most of the waste material almost immediately.

Manure handling in the building now requires only one-tenth the amount of labor needed under the old system. Now, the only cleaning is a hosing down only when changing groups of pigs.

Psychologically, the growing-finishing unit produces "friendly" pigs. The center aisle allows a man to do his chores without interference by animals—and man does not interfere with animals. The result, research workers say, is a friendly pig that has never been abused by man.

In summary, the confinement system with partial climatic control can return a desirable profit through increased use (more litters, continual production), larger volume, feed saving, and improved quality. The initial investment and risk are higher, however, and the per head cost of production is not greatly changed. The system is designed for continuous production, although the right amount of control over environment to produce the greatest dollar return is not yet known.

The confinement system is usually combined with labor-saving devices which eliminate or minimize distasteful chores such as manure handling, and make a larger volume of production possible with limited manpower. Again, these devices require additional investment, and do not materially reduce production costs per head. The labor-saving equipment alone does not greatly influence animal performance or quality, but should permit the owner to devote more time to management and less time to labor.